CLAIMS

1. An active matrix electroluminescent display device comprising an array of display pixels (34), each pixel comprising:

an electroluminescent (EL) display element (2); and

active matrix circuitry including at least one drive transistor (22) for driving a current through the display element (2),

wherein the device further comprises:

means for determining an overall brightness level of an image to be displayed in a frame period; and

means for controlling the at least one drive transistor (22) of each pixel in dependence on a respective input signal providing a drive level for the pixel and in dependence on the overall brightness level.

2. A device as claimed in claim 1, wherein the means for controlling the at least one drive transistor comprises a signal processing device (30) for determining an overall brightness level and for processing the input signals for the pixels in dependence on the overall brightness level.

3. A device as claimed in claim 2, wherein the signal processing device comprises a field store (36) for storing the input signals for an image and a summation unit (38) for summing the input signals for all pixels of the image in the field store to determine the overall brightness.

4. A device as claimed in any one of the claims 2 or 3, wherein the signal processing device is adapted to employ gamma characteristics for processing the input signals in dependence on the overall brightness level.

5. A device as claimed in claim 3 or 4, wherein the signal processing device further comprises a look up table (40) for modifying the input signals for the stored image in dependence on the overall brightness level.

6. A device as claimed in claim 5, wherein the signal processing device is adapted to calculate or select the look-up table in dependence on the overall brightness level.

7. A device as claimed in any one of claims 2 to 6, wherein the signal processing device operates to reduce the maximum brightness level to which any pixel is drive in response to an increase in the overall brightness of an image.

8. A device as claimed in claim 2, wherein the signal processing device comprises digital to analogue converter circuitry (52) for converting digital inputs into the input signal, and wherein the digital to analogue converter circuitry is controllable in dependence on the overall brightness level.

9. A device as claimed in claim 1, wherein the active matrix circuitry comprises first and second drive transistors (22,60) in parallel each connected between a respective power supply line (26,62) and the EL display element (2), the input to the pixel being provided to the gates of the first and second drive transistors (22,60), and wherein the first the drive transistor (22) is supplied with a first supply voltage (V1) and the second drive transistor is supplied with a second supply voltage (V2), at least one of the supply voltages being variable in dependence on the on the overall brightness level.

10. A device as claimed in claim 9, wherein the input to the pixel is provided to the gates of the first and second drive transistors through an address transistor (16).

11. A device as claimed in claim 9 or 10, wherein the first supply voltage (V1) is fixed and the second supply voltage (V2) is variable.

12. A device as claimed in claim 11, wherein the first and second supply voltages can be equal.

13. A device as claimed in claim 1, wherein the active matrix circuitry comprises current sampling circuitry for sampling an input drive current, the current sampling circuitry having a current sampling transistor (70) and a drive transistor (72) in parallel each connected to a respective power supply line (74,76), the circuitry being arranged such that each of the current sampling transistor (70) and the drive transistor (72) can supply current to the display element (2), wherein at least one of the supply voltages of the power supply lines is variable in dependence on the overall brightness level.

14. A device as claimed in claim 13, wherein the current sampling circuitry is operable in two modes, a first mode in which the same voltage is applied to the two power supply lines (74,76) and an input drive current is sampled and a second mode in which the voltage (V2) on at least one of the power supply lines (74) is selected in dependence on the overall brightness level.

15. A device as claimed in any preceding claim, wherein the overall brightness is determined from the drive signals for the display elements of all pixels of the display.

16. A device as claimed in any one of claims 1 to 14, wherein the overall brightness is determined from the drive signals for the display elements of a selection of the pixels of the display.

17. A device as claimed in any one of claims 1 to 14, wherein the overall brightness is determined from a weighted combination of the drive signals for the display elements of all pixels of the display.

18. A method of addressing an active matrix electroluminescent display device comprising an array of display pixels, in which each pixel comprises an electroluminescent (EL) display element (2) and active matrix circuitry

including at least one drive transistor (22) for driving a current through the display element, the method comprising:

determining an overall brightness level of an image to be displayed in a frame period; and

controlling the at least one drive transistor (22) of each pixel in dependence on a respective input signal providing a drive level for the pixel and in dependence on the overall brightness level.

19. A method as claimed in claim 18, wherein controlling the at least one drive transistor (22) comprises processing the input signals for the pixels in dependence on the overall brightness level and then applying the processed input signals (32) to the pixels.

20. A method as claimed in claim 19, wherein determining the overall brightness level comprises storing the input signals for an image and summing them.

21. A method as claimed in claim 19 or 20, wherein processing the input signals comprising modifying the input signals using a look up table, the address of which is selected in dependence on the input signal and the overall brightness level.

22. A method as claimed in claim 19 or 20, wherein processing of the input signals is performed by employing gamma characteristics of the array of display elements.

23. A method as claimed in any one of claims 18 to 22, wherein the control of the at least one drive transistor reduces the maximum brightness level to which any pixel is drive in response to an increase in the overall brightness of an image.

24. A method as claimed in claim 18, wherein the input signals are in digital form, and controlling the at least one drive transistor comprises controlling the digital to analogue conversion of the digital input signal in dependence on the overall brightness level and then applying the analogue input signals to the pixels.

25. A method as claimed in claim 18, wherein the input signal comprises a current, and wherein controlling the at least one drive transistor comprises sampling the input current using a sampling transistor (70), and supplying the display element with current from the sampling transistor (70) and a drive transistor (72) in parallel, wherein the supply voltage to at least one of the sampling transistor (70) and the drive transistor (72) is varied in dependence on the overall brightness level to vary the total current supplied to the display element.

26. A method as claimed in claim 18, wherein the current sampling circuitry is operable in two modes, a first mode in which the same supply voltage is applied to the sampling and drive transistors (70,72) and the input drive current is sampled and a second mode in which the supply voltage to at least one of the sampling and drive transistors (70,72) is selected in dependence on the overall brightness level.

27. A method as claimed in any one of claims 18 to 26, wherein the overall brightness is determined from the drive signals for the display elements of all pixels of the display.

28. A method as claimed in any one of claims 18 to 26, wherein the overall brightness is determined from the drive signals for the display elements of a selection of the pixels of the display.

29. A method as claimed in any one of claims 18 to 26, wherein the overall brightness is determined from a weighted combination of the drive signals for the display elements of all pixels of the display.